

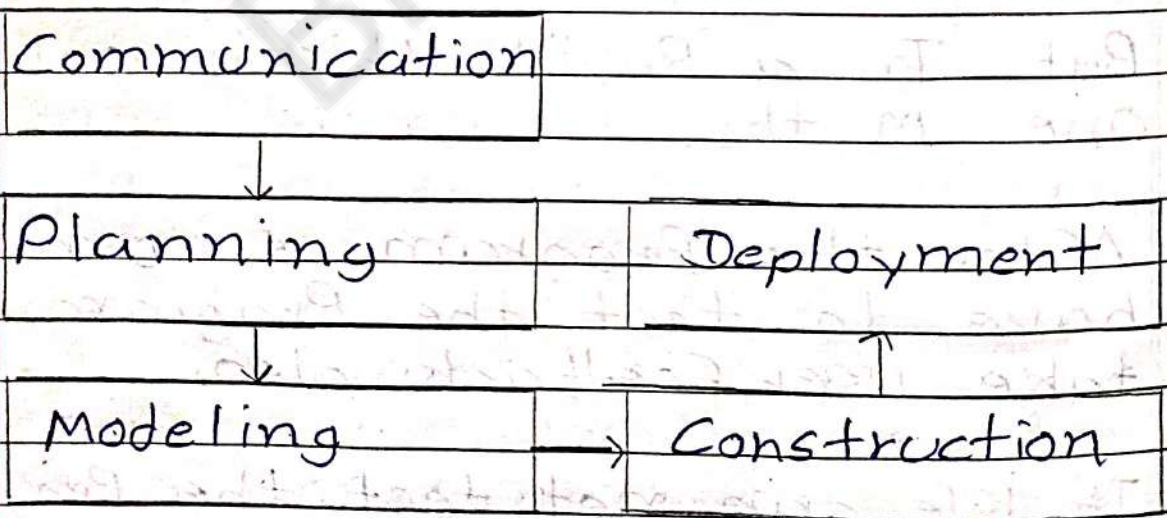
## Unit : 2 : Software Process Model.

\* Explain Different Types of Software Process Flow.

=> There are ~~Five~~ <sup>Four</sup> types of Process Flow.

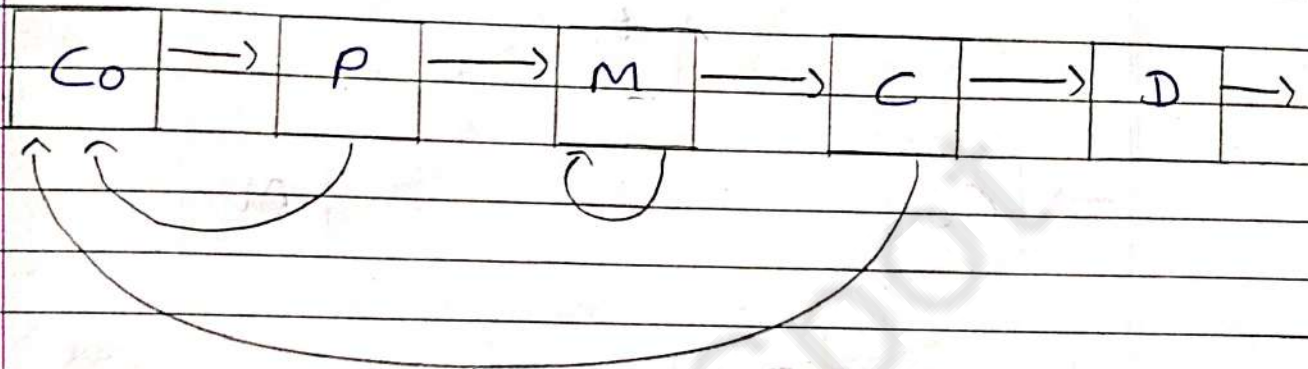
- 1) Linear Process Flow
- 2) Iterative Process Flow
- 3) Evaluationary Process Flow
- 4) Parallel Process Flow.

### 1 Linear Process Flow :



## 2 Iterative Process Flow:

For Communication  $\rightarrow$  Co  
Planning  $\rightarrow$  P  
Modeling  $\rightarrow$  M  
Construction  $\rightarrow$  C  
Deployment  $\rightarrow$  D



In this Process Flow, we have starting with Communication.

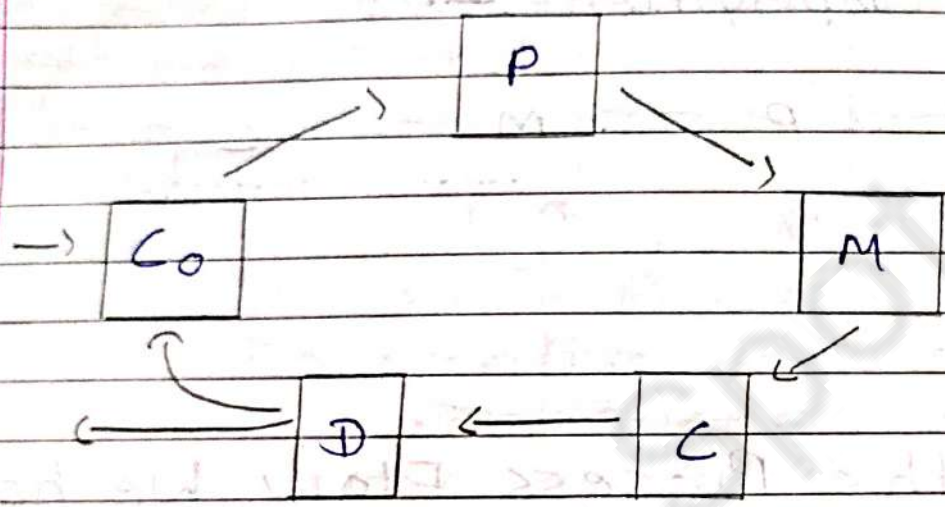
If Communication is done then we have to go for Planning.

If we done Planning then we have to go for Modeling, else we have to again go for Communication.

After the Pta Planning, Modeling is done than go into the Construction else again think For Modeling.

After the construction, if it is done than go for Deployment else start from the Communication.

### 3 Evaluationary Process Flow:

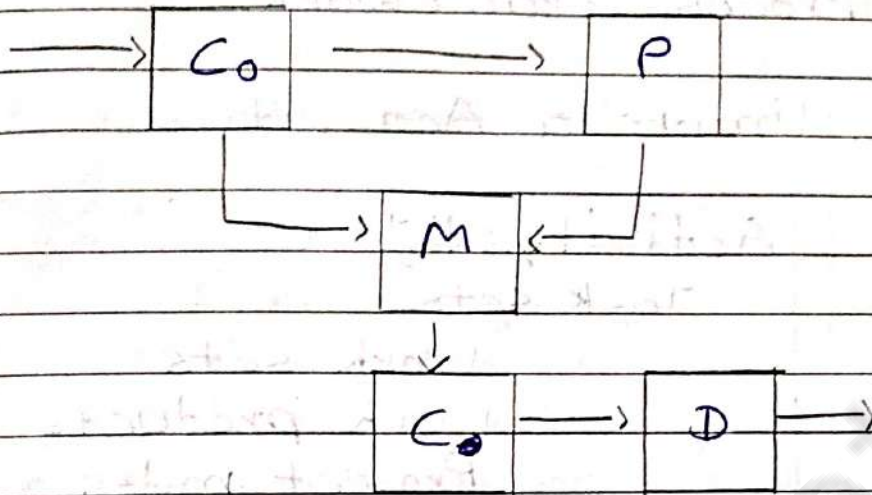


In this Process Flow, We have to start from Communication

After the Communication, We have to go for Planning, Modeling, Construction and Deployment cycle.

IF Deployment does not done than again We have start from Communication.

#### 4 Parallel Process Flow:



In this Process Flow, we have to start from the Communication.

In this Flow, we can do Planning and Communication Parallel.

If both Process are done then we have to go for Modeling, Construction and Deployment Process.

#### \* Explain Generic Process Model:

Generic Process model is collection of Software Process, Process Framework and Umbrella Activities.

# Software Process

## Process Framework

### Umbrella Activities

#### Activity #1

Task sets

work sets

work products

Project milestones

#### Activity #n

Task sets

work sets

work products

Project milestones

Software Process includes Task, Action and Activities.

Each of the activities, action and task reside within a framework.

Process Framework is described  
Five Framework activities.

This are the Five Process Framework  
ork activities.

- 1) Communication
- 2) Planning
- 3) Modeling
- 4) Construction
- 5) Deployment

Communication: In this Process  
we have to gether information  
of a Software or gether customer  
software requirements.

Planning: After the communication  
with customer we have to make  
plane for create a Software.

Modeling: According to Planning  
of a software, we have to design  
a software.

Construction: According to design  
of a software we have to create  
code for a software.

Deployment: After the construction of software, we have to take customer feedback.

Umbrella Activities are that take place during a software development process for improved Project management and tracking.

There are Eight Umbrella Activities are use in this model.

\* Explain Software Process Models.

or

Explain Software Development Lifecycle.

or

Explain Software Development Model.

or

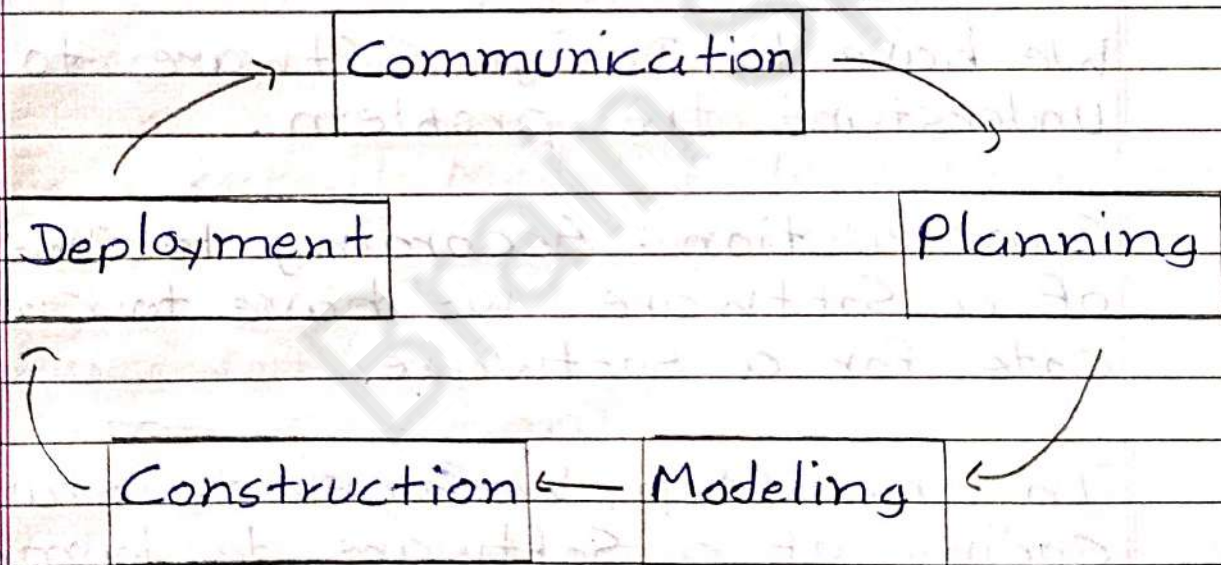
Explain Application Development Lifecycle.

=> A Software life cycle is a diagrammatic representation of the software working system or life cycle.

Software life cycle represent the various activities performed on a software.

SDLC Framework includes the five steps.

- 1) Communication
- 2) Planning
- 3) Modeling
- 4) Construction
- 5) Deployment



- **Communication**: In this process we have to gather information of a software or gather customer software requirements.

Using communication, we have to collect all the information of



## Software.

- Planning : After the communication with customer, we have to make plan for create a Software.

According to Planning, We have to work on Software development.

- Modeling : According to Planning of a Software, we have to design a software.

We have to Design Software to understand the problem.

- Construction : According to Design of a Software, we have to create code for a Software.

In this step, we have to start coding of a Software development.

- Deployment : After the complete all the step, we have to take customer feedback.

According to customer feedback we have to change the Software.

\* Explain Waterfall Model with its diagram.

=> Waterfall model is also called classical Lifecycle or Linear sequence model.

Waterfall model is the basic software development life cycle model.

Software development life cycle is based on the waterfall model.

Waterfall Model follow Sequential approach to develop software.

Communication

Planning

Modeling

Construction

Deployment

## - Communication :

In Communication step, we have to initialize the Project or Software.

After the initialize the Project, we have gether the information regarding the project.

## - Planning :

After the Communication, We have to make estimation of Software cost.

In Planning, We have to make Plan to develop Software and make schedule for project.

## - Modeling :

After the Planning, We have to create detail analysis for Project.

In Modeling, We have to create design for a project or software.

## - Construction :

After the modeling, we have to start coding for project.

In Construction, after the coding of project we have to do testing of a project.

## - Deployment :

After the testing, we have to deliver the software to the customer.

After the delivery, we have to take feedback from customer and according to feedback, we have to change in the software.

## -> When to use this Model :

When we have clear Project Requirements, clear Project define or clear technology use then we have to use this model.

-> Advantages :

Working of Water Fall model is very simple so, Human can easily understand this model.

-> Disadvantages :

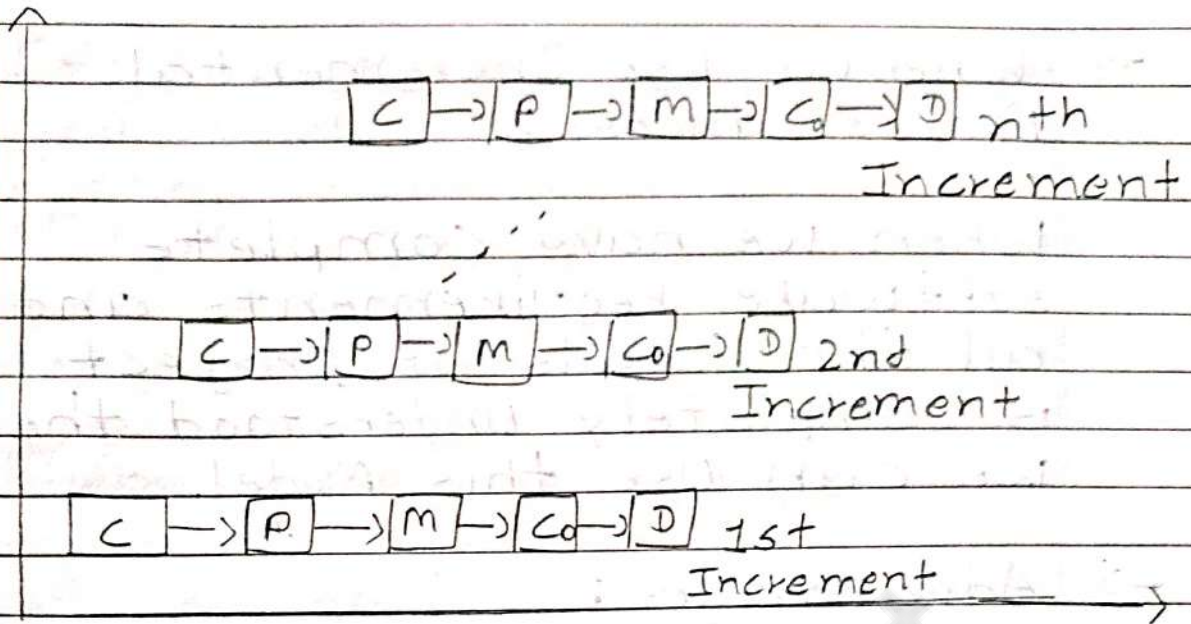
When we have Large Project than deadlock can be occur due to the delay in any step.

\* Explain Incremental Process Model.

=> Incremental Process Model is combine Linear and parallel process flows.

In this model, whole Project is divided into the increment.

Whole Project works on increment which is follow Linear process flow.



C -> Communication

P -> Planning

M -> Modeling

$C_o$  -> Construction

D -> Deployment

In Increment, All the Project works Follow Linear Process flow.

When One Increment is done than we can deliver this increment into the customer.

According to Project duration time, increment is deliver to the customer.

→ When we Use Incremental Process Model :

When we have complete software requirements and all the details of project is completely understood then we can use this Model.

→ Advantages :

Using this model, we can create software very quickly and we can easily test the software.

→ Disadvantages :

Cost of this model is more compare to water fall model and It can be increase complexity in a Software.

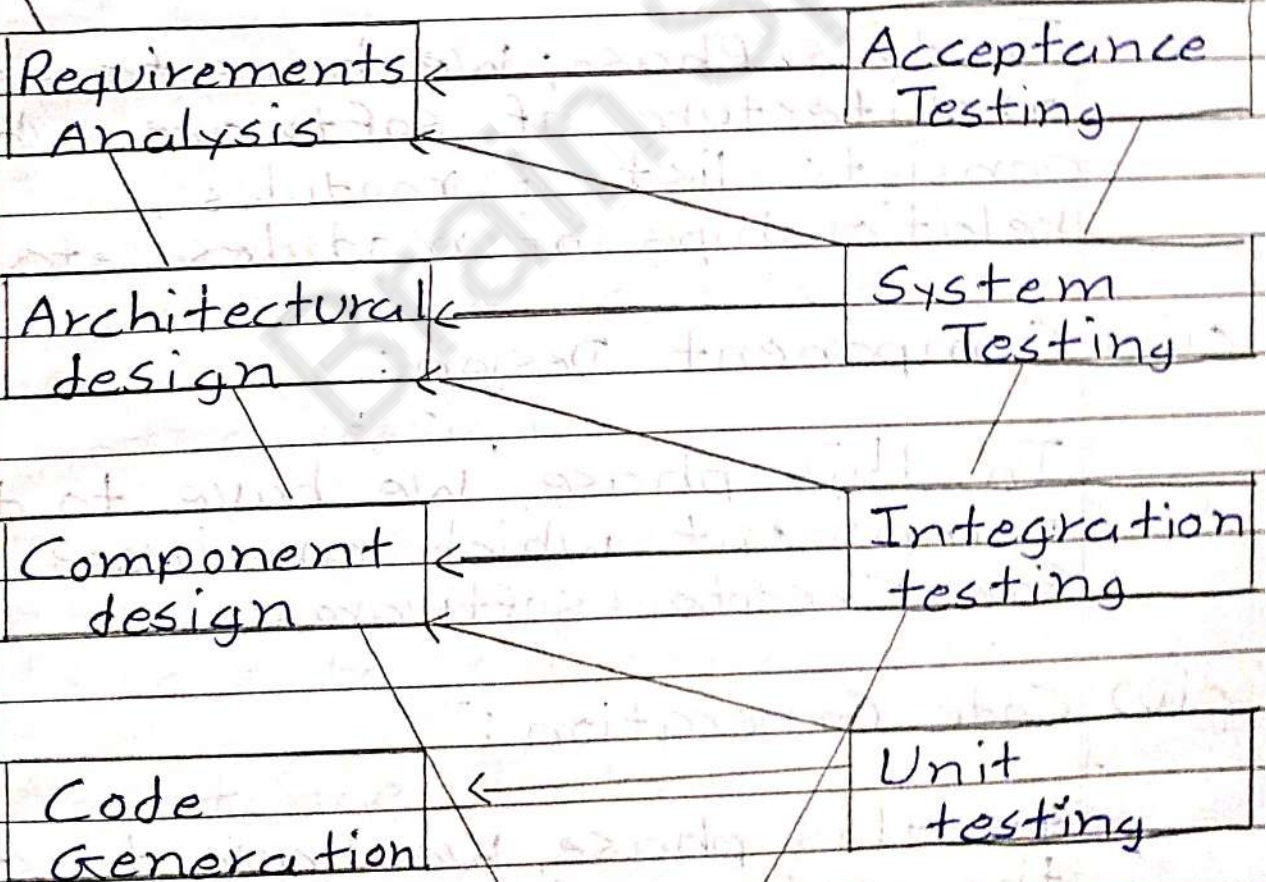
\* Explain V-Model with its advantage and disadvantages.

=> V-Model is stands for Verification and Validation Model, which is extension of Waterfall model.

There are two Phase in V-Model.

a) Verification Phase

b) Validation Phase.





## a Verification Phase :

There are four Phase in the Verification Phase.

### ci) Requirements Analysis :

In this Phase, we have to collect the requirements of software. Using communication, we can do requirements analysis.

### cii) Architectural Design :

In this Phase; we have to select architecture of software which consists list of modules, relationships of modules etc.

### ciii) Component Design :

In this phase, we have to design component which are used for create software.

### civ) Code Generation :

In this phase, we have to start the coding of a software.

## b) Validation Phase:

After the compliance of Verification Phase, we have to start this phase.

There are four Phase in the Validation Phase.

### (i) Unit Testing:

In this phase, we have to test modules one by one in software testing.

### (ii) Integration Testing:

In this phase, we have to test Architectural design which is design in verification test.

### (iii) System Testing:

In this phase, we have to test component which is used to create software.

### (iv) Acceptance Testing:

In this phase, we have to test

# Software requirement analysis part.

-> Where we use V-Model:

When we have small to medium sized project and we have clearly fixed requirement then we can use this model.

-> Advantages:

Using this model, we can save the time, track the projects and test the every modules of software.

-> Disadvantages:

Using this model, we can not analysis risk in the software.

\* Explain Evolutionary Process Model with its types.

=> In Evolutionary Process model, requirements are implemented by their priority.

Evolutionary Process model brings a significant reduction in risk for software projects.

This Model is increase management visibility of project progress and product team productivity.

There are Two type of Evolutionary Process Model.

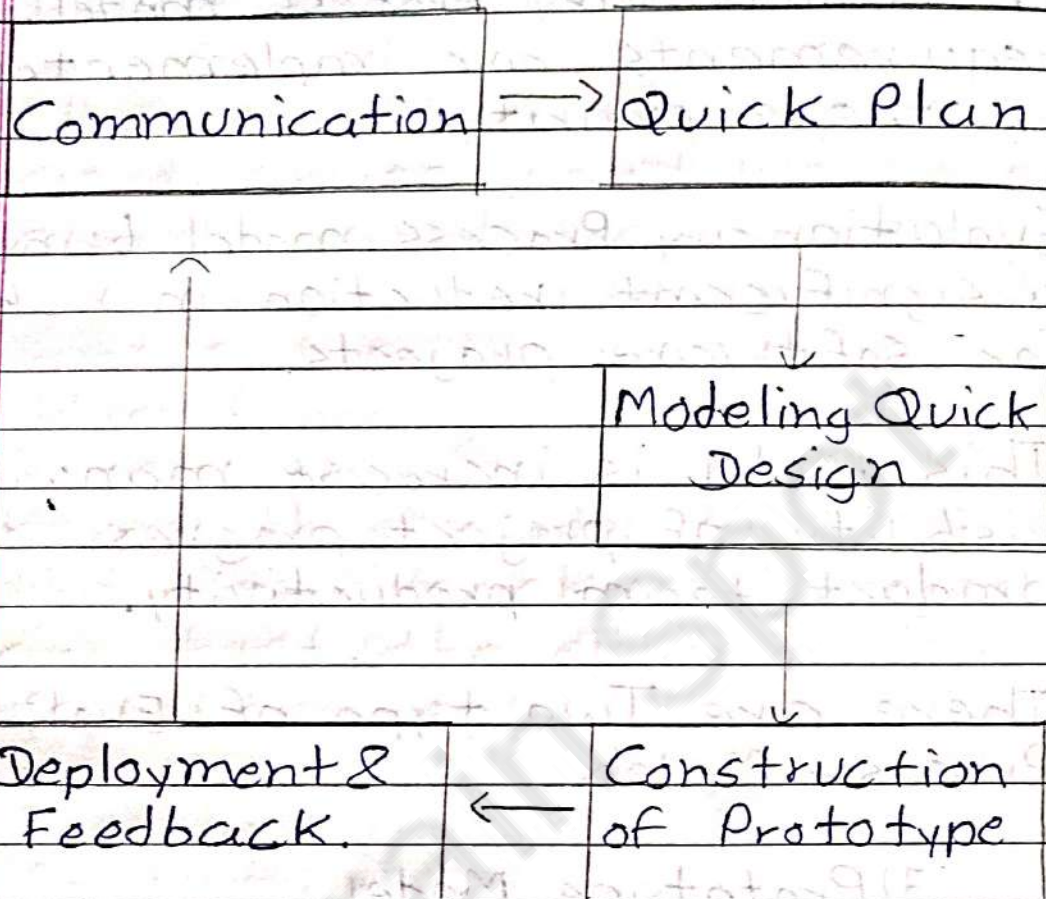
- 1) Prototype Model.
- 2) Spiral Model.

1 Prototype Model :

Prototype Model is a type of Evolutionary Process Model.

This model provides mechanism for identifying software requirement.

Using this model, users get feel for the actual software system.



This are the basic step of Prototype Model.

- a) Communication
- b) Quick Plan
- c) Modeling Quick Design
- d) Construction of Prototype
- e) Deployment & Feedback.

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### a Communication:

In this step, Using Communication, we have to communicate with customer and stockholders to define objective of software.

### b Quick Plan:

According to communication, we have to create Quick Plan for execute the software.

### c Modeling Quick Design:

According to communication and Quick Plan, we have to create Quick Design of a software.

### d Construction of Prototype:

According to design of a software, we have start coding of the software and create a software Prototype.

### e Deployment & Feedback:

After the create the software

Prototype, we have to test the software and take customer's feedback.

If customer need any changes in a software than we have to start this cycle again.

-> Where we use Prototype Model:

When we don't have clear objective or requirement of software and developers are not sure about the technical feasibilities than we use this Model.

-> Advantages:

Prototype Model reduce the risk of incorrect user requirement and maintenance cost.

-> Disadvantages:

Requirement of software and technical feasibilities are not well-defined, so software

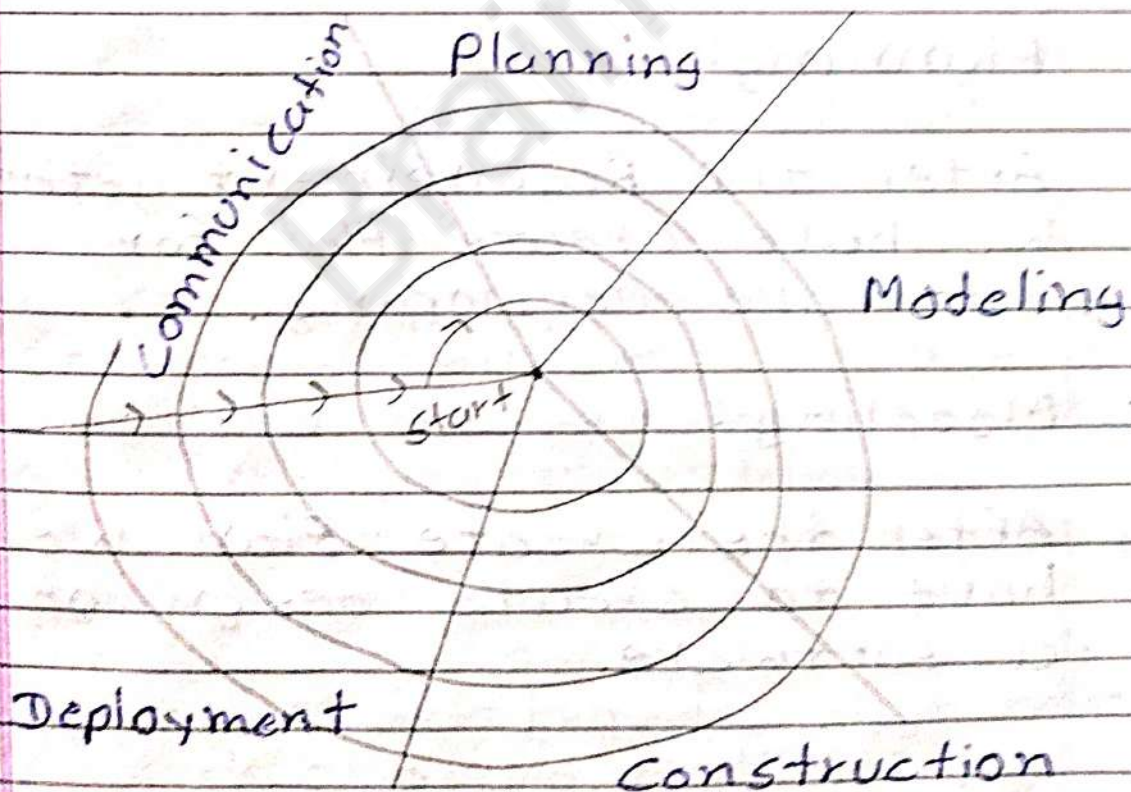
quality may be suffers.

## 2 Spiral Model:

Spiral Model is also type of Evolutionary Process Model.

Spiral Model provides the potential of rapid development.

In this Model, Framework activities is divided into the Segment of the Spiral.





This are the Segment of Spiral.

- a) Communication
- b) Planning
- c) Modeling
- d) Construction
- e) Deployment

a Communication:

In this step, we have to communicate with customer and gether requirements of software.

b Planning:

After the Requirement gethering, we have create Plan for software developing.

c Modeling:

After the Create Plan, we have to create design of a software.

#### d Construction :

In this step, we have to start coding of the software.

#### e Deployment :

After the complete all the step, we have to test the software and take customer's feedback.

If Customer needs any improvement in the software than we have again start the cycle.

#### → When we use Spiral Model:

When we have large and high risk projects, requirement is complex and any change is expected in software then we have to use this model.

#### → Advantages :

Spiral Model Provides High amount of risk analysis and strong

approval and documentation control.

-> disadvantages:

Spiral Model can be costly for use and not efficient for smaller projects.

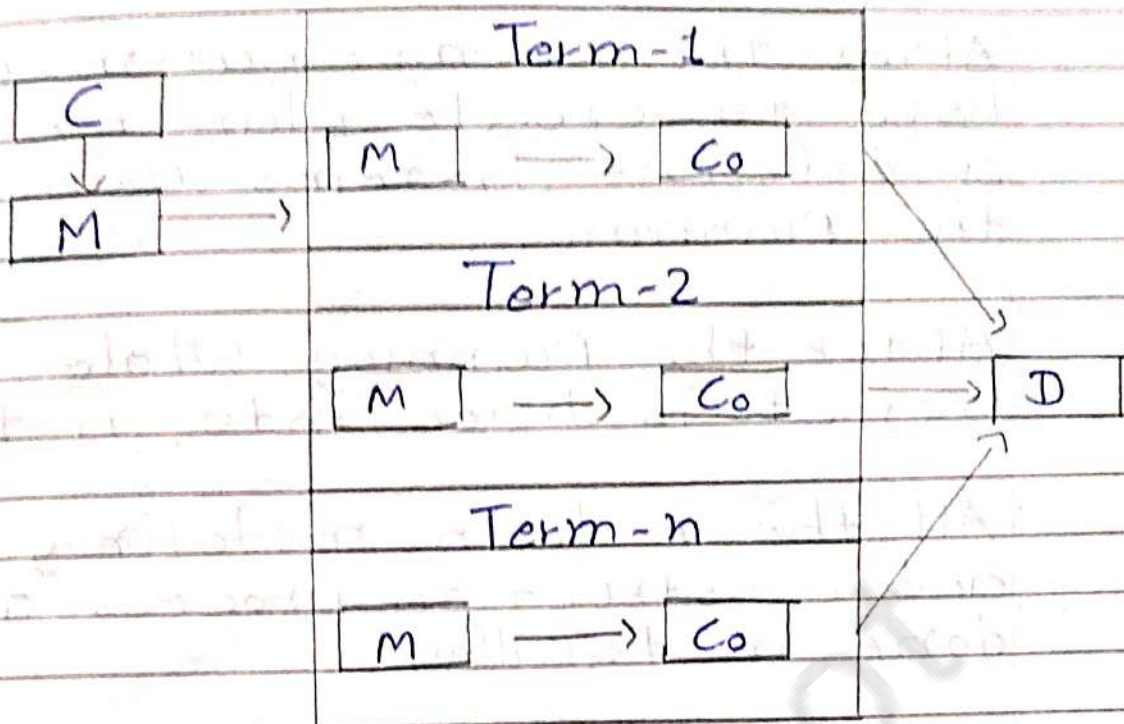
\* Explain RAD Model with its advantages and disadvantages.

=> RAD Model stands for Rapid Application Development Model.

RAD Model is a type of incremental model in which components are developed in parallel.

RAD Model is also contains Process Framework activities.

- ci) Communication
- cii) Planning
- ciii) Modeling
- civ) Construction
- cv) Deployment



C - Communication  
 P - Planning  
 M - Modeling  
 Co - Construction  
 D - Deployment

In RAD Model, whole Project divide into different Part.

Whole Project, Communication done in a one time.

In Communication phase, we have understand the Problem and collect requirement of a software.

After the Communication, we have to create plan for a different systems using the Planning.

After the Planning, whole Project is divide into  $n$  term.

All the  $n$  term, modeling and Construction process are done in Parallel.

In Modeling, we have to design Business Model which show the information flow in software, Data Model which refine the information into data.

In Construction, we have to create a code for a project and test the code.

After the completing Modeling and Construction, we have to start Deployment process.

In Deployment, we have to take customer feedback and provide delivery of Software.

-> When we use RAD Model:

When duration of Project is 2-3 Month and Resources are available with all the knowledge then we can use this model.

-> Advantages:

RAD Model can reduced development time and increases reusability of components.

-> Disadvantages:

When we have Large technical risks in project then we can not use this model.

\* Explain Concurrent model with its advantages and disadvantages

=> Concurrent model is also called Concurrent development Model.

In Concurrent model, Software process activities is divide into the different state.

In Under development state, development of project is starting, and if development is done than it goes into the under review, also goes into the awaiting changes.

In Under Review state, we have to start the testing of the project.

If testing is done then it goes into the Done state else go into the Baselined state.

In Baselined state, we have to check SRS document with the project and go into the Done state.

If customer required any changes than it goes into the awaiting changes state.

In Awaiting changes state, project collect all the user requirement changes and go into the under revision state.

In Under Revision state, project can change according to user requirement and go into the under review state.

-> When we use Concurrent Model:

When we want to run two or process run at a time then we can use this model.

-> Advantages:

Concurrent Model is applicable for all the types of software development process.

-> Disadvantages:

In Concurrent Model, we require better communication between the team members.



\* Explain component based development model with its advantages and disadvantages.

=> Component Based Development model  
Follow CoTS software components.

CoTS stands for Commercial Off The Shelf which component offered as product.

CoTS provides set of functionality with its well defined interfaces.

CoTS Interface enables the software component to be integrated into software.

The component based model contains many characteristics of the spiral model.

Component Based Development model is evolutionary in nature.

Component Based Development components are integrated into the architecture.

-> Advantages:

This model is reduces developme cycle time and reduces project development cost.

-> Disadvantages:

When we developing this model then system evolution and maintenance are some of the challenges.

\* Explain Agility with its principle

=> Agility is a property consisting of quickness, lightness and ease of movement.

Agility Software process model refers to a iterative approach development.

Agility has ability to create and respond to change in order to profit project environment.

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Agility provides very fast response to sudden & changes in project.

Agility provides effective communication between all the stakeholders for a project.

→ Agility Principle:

This is a basic Agility Principles.

- 1 Highest Priority is to satisfy the customer and provide continuous delivery of software.
- 2 Always welcome the changing requirements of software.
- 3 Provides delivery of working software.
- 4 Business people and developers must work together.
- 5 Build projects around motivated environments.
- 6 Development team required face-to-face conversation.

- 7 Working software is the measure of progress.
- 8 Provides continuous attention to technical excellence and good design.
- 9 Simplicity - Maximizing the amount of work done.
- 10 The best architectures and requirements from self-organizing teams.
- 11 At regular intervals, the team reflects on how become more effective.

\* Explain Extreme Programming model.

=> Extreme Programming is one of the most important and widely use Agile models.

A variant of XP called Industrial XP has been proposed to target large organizations.

For Software development using XP Model, we have to use XP Value.

There are Five XP Values in XP Model.

- ci) Communication: Using communication between customer and developer, we have to collect the requirement of Software.
- cii) Simplicity: Developers have to make design for immediate needs.
- ciii) Feedback: We have to take customer and other software team member feedback and do Unit testing.
- civ) Courage: XP team members have courage to design software today.
- cv) Respect: XP team member have to respect to all the team members.

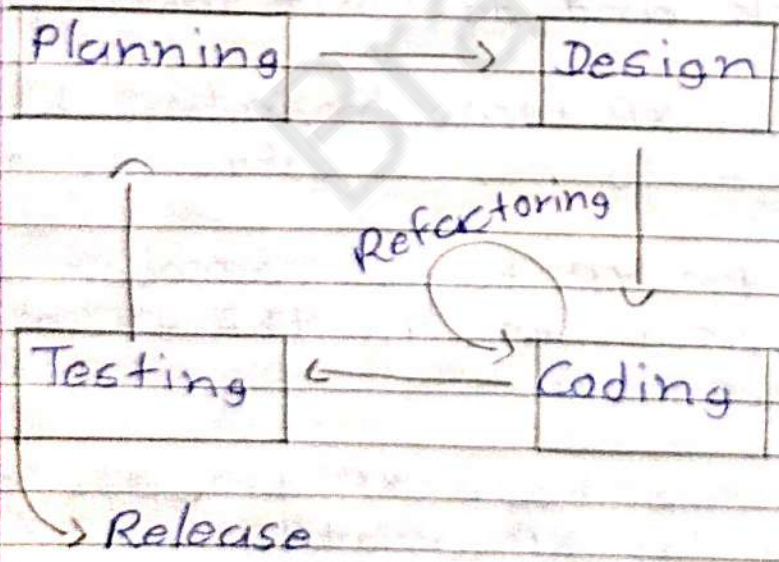
There are Four XP Process, that is use in XP model.

(i) Planning:

In Planning, We have to collect the Software Requirement using the communication.

In this phase, we have to make User stories which contains customers priority, customer requirement and risk of software.

In this phase, we have to make Project Velocity which contains number of stories, estimates for future release.



### cii) Design :

In Designing phase, we have create design such a way that follow Keep-it-simple principle.

We have to create CRC Card which use to identify the Object Oriented class in project.

We have to create spike solution which is use to create simple program to build exp potential solutions.

We have to create code in a such a way that can be use Reuse or regenerate again in software.

### ciii) Coding :

In coding phase, we have to use unit test for stories.

After the creation of code, we have to do unit test and get immediate feedback.

In this phase, we have to do

Pair Programming is in which two developers work together.

### civ) Testing :

In Testing phase, we have to do unit test and fix the all the problems.

We have to also use Acceptance tests in which we have to take customer feedback after the every unit code creation.

If customer accept the software than we can release the project.

#### - Advantages :

Using XP Model we can save the costs or ~~save~~ save the time. Constant feedback of every unit make software very strong.

#### - Disadvantages :

XP Model is focused on the code



rather than software design  
So, may be software design will  
be changed.

\* Explain Scrum Agile Process  
Model.

=> Scrum Agile Process model  
is a Lightweight Process Framework

Scrum Process model is use to  
developing the complex software  
system.

In Scrum Process model, we have  
to create sprint which is  
contain the requirements  
mentioned in the backlogs.

Duration of sprint will be  
Two to Four weeks or ~~Thirty~~ 30  
Days.

Sprint allows the team member  
to work in stable environment.

In Scrum Process model, we  
have to create Backlog which  
is prioritized list of project

requirements that is provide by customer.

We can add any items in a backlog at any time during the software creation.

We have to Priorities customer requirement in backlog list.

In Scrum Process model, the Leader of Software is called Scrum master.

Scrum master have to arrange the scrum meeting in every days.

Duration of Scrum meeting will be 10 to 15 minutes in a one day.

In Scrum Process model, we have to create Demo of Software.

Before the deliver of Software we have to show the demo of Software to the customer.

We have to demonstrated all the functionalities of Software to the customer.

-> Advantages:

Scrum Framework working is very fast and cost efficient, Scrum model can reduce the 40% of Software creation time.

-> Disadvantages:

Scrum Framework do not allows changes into the sprint. It is more efficient for small project size.

\* Explain Adaptive Software development Process model.

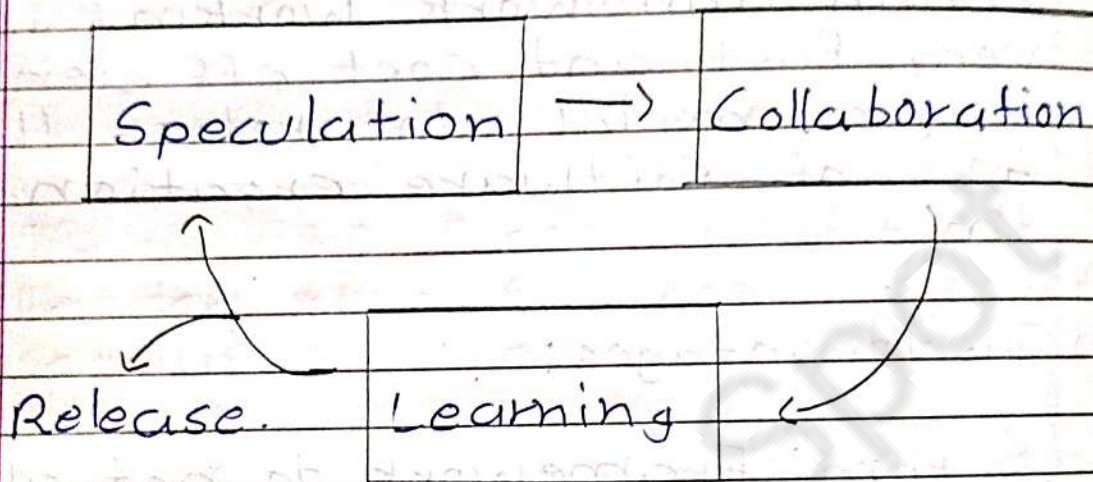
=> Adaptive Software development is use to create complex software.

Adaptive Software development model is use iterative approach.

There are three Phases in ASD.

2

- 1) Speculation
- 2) Collaboration
- 3) Learning.



3

## 1 Speculation:

This is first or starting phase of ASD in which we have to Intialize the software.

In this phase, we have to collect the customer's requirement of software.

In this phase, we have to also decide the project delivery date or project cost

CIS

## 2 Collaboration :

In this phase, we have to collaborate all the members of development team.

Every team member should be assist each other without any offense.

Every team member should be work hard and help each other during the project creation.

## 3 Learning :

Learning helps the members to increase their level of understanding over the project.

There are three ways for members Learning.

- ci) Focus Groups
- cii) Technical Reviews
- ciii) Project Postmortem

ci) Focus Groups : We have to take feedback from the end-users.

cii) Technical Review: Every phase of software creation, we have to take technical review.

iii) Project Postmortems: In this phase, we have to do team analysis.

→ Advantages:

Using ASD Model, we create better and strong software because it increased transparency between developers and customers.

→ Disadvantages:

ASD model is requires high customer involvement for software creation.

\* Explain Dynamic Systems Development Methods.

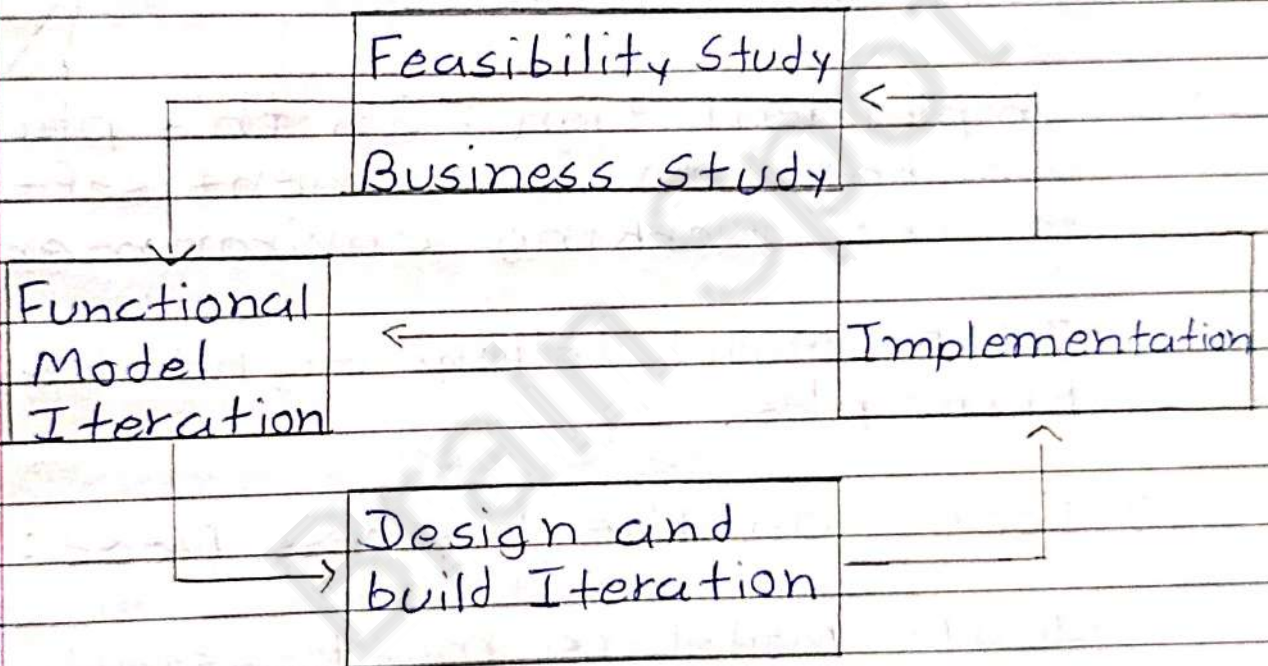
cii)

=> DSDM is working on Iterative approach, Incremental model or Rad Model.

cii)

There are five phases in Dsom Model.

- ci) Feasibility Study
- cii) Business Study
- ciii) Functional Model Iteration
- civ) Design and build Iteration
- cv) Implementation.



ci) Feasibility Study: In this phase, we have to do budget Planning and collect the software requirement.

cii) Business Study: In this phase, we have to do Functional Requirement identification.

ciii) Functional Model Iteration: In this phase, we have to adopte incremental approach for software development.

civ) Design and Build Iteration: In this phase we have to create design of a software and start the coding of a software.

cv) Implementation: In this phase, we have to increment software to the working environment.

DSDM model follow eight key Principles.

c1) Focus on the Business Need:

DSDM model is must establish a valid business case or logic.

c2) Deliver on Time:

Work should be complete on time and software should be deliver on time to the customer.



(3) Collaborate :

Project Stakeholders and team member should be collaborate each other.

(4) Quality :

Quality of Project should be maintain at a end of Project.

(5) Build Incrementally from Firm Foundation :

Team of developer should the track of working on software.

(6) Developer Iteratively :

Take feedback from the customer and team members for each development iteration.

(7) Communicate continuously and clearly :

Holding daily stand-up session or informal communication can increase clear communication.

C8) Demonstrate the Control:

The Project manager and team leader should make their plan to deliver software on time.

→ Advantages:

Using this model, Projects are delivered on time and easily understood across the team member and stack holders will get strong project quality.

→ Disadvantages:

This Model require large management overhead team leader and costly implementation for project creation.